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# Modeling Decarbonization Pathways in the Power Sector in Developing Countries: The case of Colombia

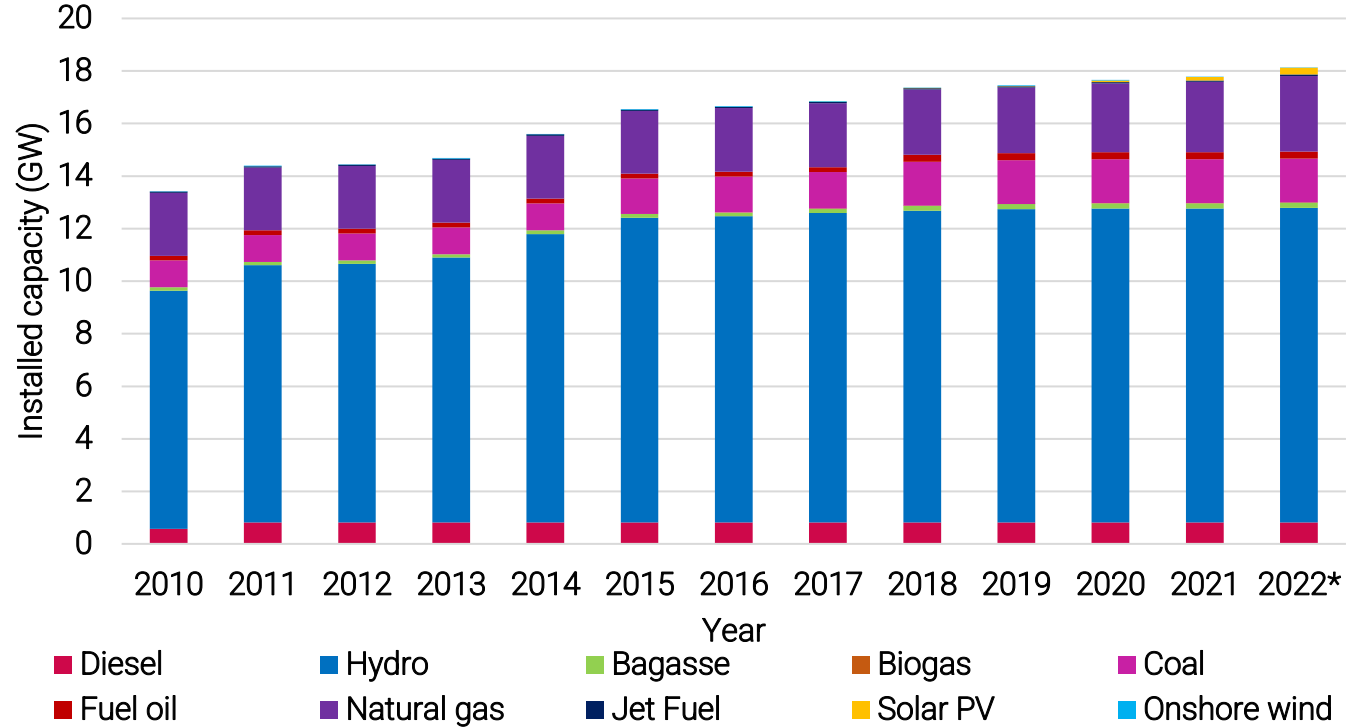


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# Context

- National Determined Contribution (Gobierno de Colombia, 2020): 51% GHG reduction by 2030 and carbon neutrality by 2050
- Electricity consumption should grow three times at the same time that the power system is decarbonized fully by 2050 (Plazas, 2022)



Source: XM, 2022

## Research questions:

- How will the Colombian power mix evolve under a full decarbonization target by 2050?
- What is the role of the storage technologies under a 100% renewable power system in Colombia?
- What is the effect of a periodical drought season caused by the ENSO in the performance of a decarbonized power system in Colombia?

# Scenarios

## Baseline (BAU)

**No carbon target**

**Historical trends remain with limited penetration of new technologies**

## Renewables (REW)

**Full decarbonization by 2050**

**New technologies are fully available (PV, wind, CSP, geothermal, thermal+CCS, large-scale batteries, PHS, hydrogen, CAES)**

## ENSO (ENSO)

**Full decarbonization by 2050**

**Reduction in 50% of capacity factor for hydro-based technologies (Mekonnen et al., 2022)**